

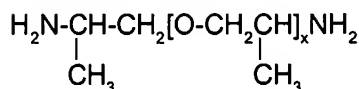
Technical Bulletin

HUNTSMAN

JEFFAMINE® D-2000 POLYOXYPROPYLENEDIAMINE

[CAS 9046-10-0]

STRUCTURE



x = 33.1

DESCRIPTION

JEFFAMINE D-2000 polyoxypropylenediamine is one member of a family of Huntsman Corporation's polyamines having as their backbones repeated oxypropylene units. As shown by the above structure, D-2000 is a difunctional primary amine having an average molecular weight of approximately 2000. Its amine groups are located on secondary carbon atoms at the ends of an aliphatic polyether chain.

D-2000 is fairly light in color and reasonably low in viscosity. Its vapor pressure is extremely low. D-2000 is completely miscible in a wide variety of solvents. It is, however, only slightly soluble in water.

SALES SPECIFICATIONS

Appearance	Light yellow with slight haze
Color, Pt-Co	100 max.
Total acetylatables, meq/g	0.98 min. 1.1 max.
Primary amine, % of total amine	97 min.
Total amine, meq/g	0.95 min. 1.05 max.
Water, %	0.25 max.

TYPICAL PHYSICAL PROPERTIES

Color, Pt-Co	100
Brookfield viscosity, cps, 25°C (77°F)	247
Specific gravity, 20/20°C	0.9964
Density, lb/gal, 20°C	8.3
Refractive index, n _D ²⁰	1.4514
Flash point, PMCC, °C (°F)	185 (365)
Water, wt. %	0.1
Total acetylatables, meq/g	1.05
Total amine, meq/g	1.0
Primary amine, meq/g	0.97
Vapor pressure, mm Hg/°C	0.93/235 4.95/254
pH, 5% aqueous solution	10.5
Equivalent weight with epoxies ("Amine hydrogen equivalent weight," or AHEW)	514

AVAILABILITY

D-2000 is available in tank cars, tank wagons, 55-gallon drums of 440 pounds net weight, and 5-gallon cans. Samples are available from any Huntsman Corporation sales office.

APPLICATIONS

JEFFAMINE D-2000 polyoxypropylenediamine undergoes reactions typical of primary amines. Because of its unique structure, D-2000 has found wide use in epoxy systems. In such applications, it is rarely used alone, but rather in conjunction with other curing agents, particularly other JEFFAMINE products. The flexibility and toughness of epoxy systems can be enhanced very efficiently through the inclusion of D-2000.

Again in conjunction with other JEFFAMINE polyamines, D-2000 is used in epoxy adhesives which are characterized by high peel strengths.

An intriguing application for D-2000 is in epoxy systems for metal priming via cathodic electrodeposition (Eur. Pat. 70-550).

Nonepoxy uses for D-2000 include oil recovery chemicals and polyamide fibers. D-2000 salts make good cutting fluids.

STORAGE AND HANDLING

Materials of Construction:

At temperatures of 75-100°F

Tanks	Carbon steel
Lines, valves	Carbon steel
Pumps	Carbon steel
Heat exchange surfaces	Stainless steel
Hoses	Stainless steel, polyethylene, polypropylene, Teflon
Gaskets, packing	Asbestos or Teflon; elastomers such as neoprene, Buna N, and Viton should be avoided
Atmosphere	Nitrogen or dry air

At temperatures above 100°F

Tanks	Stainless steel or aluminum
Lines, valves	Stainless steel
Pumps	Stainless steel or Carpenter 20 equivalent
Atmosphere	Nitrogen

While D-2000 may be stored under air at ambient temperatures for extended periods, a nitrogen blanket is suggested for all storage in case of accidental high temperatures. It should be noted that pronounced discoloration is likely to occur at temperatures above 140°F, whatever the gaseous pad.

Clean-out of lines and equipment containing D-2000 is relatively easy. Since it is at least partially

soluble in water, warm water and steam is all that is required.

In the event of spillage of this product, the area should be thoroughly flushed with water. The proper method of disposal of waste material is by incineration with strict observance of all federal, state, and local regulations.

SAFETY AND TOXICITY

JEFFAMINE D-2000 should be considered hazardous, having the potential to cause skin burns and eye irritation. Chemical-type goggles with face shield and impervious gloves must be worn when handling the product. Should accidental contact occur, flush the eyes thoroughly with water for at least 15 minutes and get immediate medical attention. In case of skin contact, immediately wash the exposed area with soap and plenty of water. If drenched, remove contaminated clothing under a safety shower. Wash clothing before reuse.

JEFFAMINE D-2000 is considered moderately toxic if swallowed or absorbed through the skin. The single oral dose LD_{50} value in rats is 0.58 g/kg and the single dermal LD_{50} value in rabbits is 0.67 g/kg. The Draize score for skin irritation in rabbits is 8.0/8.0 and the product has been determined to be corrosive to the skin by the DOT 4-hour test. The Draize score for eye irritation in the rabbit is estimated to be 50-80/110.0.

In normal operations, the vapor pressure of JEFFAMINE D-2000 is too low to present any significant exposure concentration. However, supplied air respiratory protection is recommended for cleaning up large spills or for entry into confined spaces.

JEFFAMINE D-2000 was found to be inactive in the Ames *Salmonella*/microsome plate test for mutagenicity.

For further information, request the Material Safety Data Sheet.